9
CIE
2-520c
PB

FIELD CROP ABSTRACTS

VOLUME 20, 1967

INCLUDING

ANNUAL INDEXES

Prepared by

COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS,
HURLEY, BERKSHIRE

Published quarterly by

Commonwealth Agricultural Bureaux, Farnham Royal, England

Mr. E. L. HAY, O.B.E.

Eric L. Hay died on the 18th October 1967. After spending 19 years in the Colonial Agricultural Service in Ghana, he was appointed Assistant Secretary to the C.A.B. in June 1951. His understanding, administrative ability and dedication to his work contributed enormously to the smooth running of the organisation, and this Bureau in particular will remember him as both a wise counsellor and a good friend. His death will bring sadness to his many friends at home and overseas and to the many who, over the years, sought and obtained his help and advice.

FIELD CROP ABSTRACTS

Vol. 20, Nos 1, 2, 3, 4, 1967

SUMMARY OF CONTENTS

REVIEW ARTICLES

	Pages
The effect of shelter on the productivity of grasslands and field crops. J. K. MARSHALL. Part. 1. Shelter influences.	1
Part. 2. Operative mechanisms.	7
Rice production and world hunger. J. VALLEGA	15
Physiological approaches to yield determination in wheat and barley. R. H. M. LANGER	101
Sesame. A. J. TRIBE	189
The effect of weather on the growth of barley. L. P. SMITH	273

ABSTRACT SECTION

	Pages
ANNUAL FIELD CROPS	
CEREALS	
Wheat	17 107 195 279
Oats	26 115 203 289
Rye	28 116 205 291
Barley	29 116 205 291
Maize	33 120 208 295
Sweet-corn	38 126 214 302
Sorghums and other millets	38 126 214 302
Rice	41 128 216 304
Teosinte	46
Teff	137
Job's tears	46
General	46 137 221 310
LEGUMES	
Cowpeas	48 139 223 313
Soyabeans	48 139 223 314
Groundnuts	51 140 226 317
Peas	52 141 227 318
Field Beans	54 228 320
Adzuki beans	143 229
Phaseolus	321
Lupins	55 143 321
Chickpeas	143 229
Pigeon peas	143
Lentils	55 143 229
Guar	321
Lablab niger	322
General	55 144 229
ROOT CROPS	
Sugar-beet	55 144 230 322
Fodder-beet	325
Swedes and turnips	58 147 233 326
Carrots	58
Potatoes	59 147 233 326
Sweet-potatoes	66 151 236 332
Cassava	152 237
Yams	152 237 333
Cocoyams and tania	152 237 333
Jerusalem artichoke	333
Arracacia xanthorrhiza	66 333
General	333
FIBRE CROPS	
Cotton	66 152 237 334
Fibre flax	71 156 241 338
Hemp	71 156 242 339
Jute	72 242 339
Kenaf	72 156 242 340
Sunn hemp	72
OIL CROPS	
Castor bean	72 156 242 340
Sesame	156 340
Oil-seed flax	72 157 243 340
Safflower	73 157 243 341
Sunflower	73 157 244 341
Rape	74 158 244 342
Sarson	74
Mustard	74
Poppy	158 342
Crambe	158 244 343
General	159 343
MISCELLANEOUS CROPS	
Buckwheat	74 245 343
Kale	75 159 246 343
Tobacco	75 159 246 343
GREEN MANURES AND COVER CROPS	80 163 250 348
CROP BOTANY	
Morphology	250
Metabolism and nutrition	81 163 251 348
Growth and development	83 167 252 350
Growth substances	83 167 252 351
Environment	84 168 253 351
Radiobiology	84 169 352
Techniques and apparatus	85 169 253 353
Miscellaneous	254
WEEDS and WEED CONTROL	86 171 255 355
SURVEYS and LAND USE	87 172 255 355
FARMING SYSTEMS and PRACTICES	88 173 256 356
SOIL and WATER CONSERVATION	89 174 256 358
AGROMETEOROLOGY and CLIMATOLOGY	89 174 257 359
MISCELLANEOUS	90 175 258 359
REPORTS	91 175 258 360
MEETINGS	92 180 263 364
BOOKS	95 181 266 366
NEWS and NOTES	97 186 270 372
ANNUAL SUBJECT INDEX	377
ANNUAL AUTHOR INDEX	417

NOTES TO READERS

Where † follows the number of an abstract, it indicates that the abstract is duplicated in *Herbage Abstracts.*

The address given is that of the first author at the time of writing and is normally where the work was carried out.

Transliteration of Cyrillic script follows the British system (British Standard 2979 : 1958).

ABBREVIATIONS

Periodicals. The abbreviations used for the titles of periodicals and reports conform where possible to those given in the *World List of Scientific Periodicals* (4th Edn ; London : Butterworth) and are listed in *Field Crop Abstracts* Vol. 18, No. 4, pp. ix - xxxv.

Languages. The language abbreviations used are based on British Standard 3862 : 1965. An initial capital letter denotes the main language of a paper, a small letter the language of the summary(ies).

Af — Afrikaans	F — French	Pt — Portuguese
Bg — Bulgarian	Fi — Finnish	Ru — Russian
Ch — Chinese	Hu — Hungarian	Ro — Romanian
Cs — Czech	I — Italian	Sh — Serbo-Croat
D — German	J — Japanese	Sk — Slovak
Da — Danish	Nl — Dutch	Sv — Swedish
E — English	No — Norwegian	Tr — Turkish
Es — Spanish	Pl — Polish	Uk — Ukrainian

Units, chemical elements, etc. The abbreviations used for the names of common units, mathematical operations, chemical elements, etc. are in accordance with British Standard 1991 : 1954. The following additional abbreviations are also used :

a.e.	— acid equivalent	F.U.	— food/fodder unit
a.i.	— active ingredient	f.y.m.	— farmyard manure
alt.	— altitude	LAI	— leaf-area index
bibl.	— bibliography	lat.	— latitude
CP	— crude protein	m.eq.	— milli-equivalent
cv.	— cultivar(s)	NAR	— net assimilation rate
DM	— dry matter	ppm.	— parts per million
f.c.	— foot candle	SE	— starch equivalent
F.C.A.	— *Field Crop Abstracts*	var.	— *varietas*
F.s.	— From summary	yr	— year(s)

THE COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS

HURLEY, BERKSHIRE

The Commonwealth Bureau of Pastures and Field Crops is located at the Grassland Research Institute, Hurley, and is one of a group of 11 Bureaux and 3 Institutes which together form the Commonwealth Agricultural Bureaux, an organization financed and administered jointly by the various Commonwealth Governments and Dependent Territories and which provides an information service covering all the major branches of agricultural science.

The Bureau prepares two quarterly journals, *Field Crop Abstracts* and *Herbage Abstracts*, for publication by the Commonwealth Agricultural Bureaux, Farnham Royal, Bucks. These journals contain abstracts of the research findings reported in the world scientific literature on annual field crops, pastures, herbage plants and rangelands and provide both a comprehensive guide to current scientific and technological developments in their subjects and a key to the literature published in the past. In addition to abstracts, the Bureau also issues reviews and monographs on selected subjects.

SCOPE OF *Field Crop Abstracts*. The subjects covered include the agronomy and botany of all annual field crops grown for food, fodder, oil and fibre, and of tobacco and green manures. Land use, farming systems, agricultural meteorology and the control of weeds, pests and diseases are dealt with only in so far as they concern the crop coverage.

SERVICES OFFERED. The Bureau undertakes to answer enquiries and to provide bibliographies on subjects within its scope. Photocopies of papers abstracted can be supplied on request at 2s. per page of text, post free : see inside back cover.

Director
C. L. SKIDMORE, B.Sc. (Agric.) (Lond.), Dip. Agric. (Wye), A.I.C.T.A.
Assistant Director
P. J. BOYLE, M.A. (Agric.) (Cantab.)
Scientific Information Officers
Mrs. E. BIASUTTI OWEN (Dr., Milan)
A. V. BOGDAN, Cand. Biol. Sci. (Rostov), F.L.S.
R. BOYCE, B.Sc. (Dunelm), M.I.Inf.Sc.
R. H. FORSTER, B.Sc. (Lond.), Dip. Agric. (Cantab.), D.T.A. (Trin.)
M. R. HAILS, B.Sc. (Agric.) (Nottm), Dip. Agric. Econ. (Reading)
M. S. MAHAL, B.Sc. Agric. (Punjab), Cand. Agric. Sci. (Moscow), Dip. Russ. Lang. (Moscow)
Indexers
C. R. RAPER, B.Sc. (Agric.) (Nottm), D.T.A. (Trin.), A.I.Inf.Sc.
C. G. WALDOCK, O.B.E., B.A. (Cantab.)
Consultant Director
E. K. WOODFORD, O.B.E., M.Sc. (Alberta), Ph.D. (Lond.)
Director, Grassland Research Institute, Hurley, Berkshire.
Other abstractors contributing to this issue :
M. A. AKENHEAD, B.Sc., Dip. Agric., A.I.C.T.A.
Mrs. A. M. HALL, Ph.D
A. G. G. HILL, B.A., Agr.B., B.Sc.
M. G. WALKER, B.Sc.

The Executive Council of the Commonwealth Agricultural Bureaux is a signatory to the Fair Copying Declaration, details of which can be obtained from The Royal Society, Burlington House, London, W.1.

The Commonwealth Agricultural Bureaux Organization does not accept responsibility for any trade advertisement included in this publication.

© Commonwealth Agricultural Bureaux, 1967

SUBSCRIPTION RATES

C.A.B. JOURNALS

The journals of the COMMONWEALTH AGRICULTURAL BUREAUX are heavily subsidized by contributing countries, to the extent of over £600,000 per annum. Subscribers in contributing countries, therefore, are allowed reduced subscription rates ; and subscribers in other countries are still able to obtain the journals at prices that are far below cost. The contributing countries are the United Kingdom of Great Britain and Northern Ireland, Canada, Australia, New Zealand, India, Pakistan, Ceylon, Ghana, Malaysia, Nigeria, Cyprus, Sierra Leone, Tanzania, Jamaica, Trinidad and Tobago, Uganda, Kenya, Malawi, Zambia, The Gambia, Guyana, Barbados, Dependent Territories and the Republic of Ireland. Botswana and Lesotho have been invited to become members. The prices of the journals are as set out below :

Title	Annual Subscription: Rate to subscribers in non-contributing countries	Annual Subscription: Rate to subscribers in contributing countries
Review of Applied Entomology		
Series A. Agricultural	180/- ($27·00)	90/-
Series B. Medical and Veterinary	80/- ($12·00)	40/-
Bulletin of Entomological Research	150/- ($22·50)	100/-
Review of Applied Mycology	210/- ($31·50)	110/-
Review of Medical and Veterinary Mycology	80/- ($12·00)	40/-
Nutrition Abstracts and Reviews	330/- ($49·50)	230/-
World Agricultural Economics and Rural Sociology Abstracts (WAERSA)	150/- ($22·50)	90/-
Animal Breeding Abstracts	210/- ($31·50)	110/-
Veterinary Bulletin	250/- ($37·50)	120/-
Index Veterinarius	300/- ($45·00)	140/-
Dairy Science Abstracts	210/- ($31·50)	110/-
Forestry Abstracts	210/- ($31·50)	110/-
Helminthological Abstracts	150/- ($22·50)	80/-
Horticultural Abstracts	240/- ($36·00)	110/-
Herbage Abstracts	**150/- ($22·50)**	**80/-**
Field Crop Abstracts	**150/- ($22·50)**	**80/-**
Plant Breeding Abstracts	210/- ($31·50)	110/-
Soils and Fertilizers	230/- ($34·50)	90/-
Weed Abstracts	120/- ($18·00)	100/-

All the above journals are obtainable (post free) from :

CENTRAL SALES BRANCH,

COMMONWEALTH AGRICULTURAL BUREAUX,

FARNHAM ROYAL, BUCKS, ENGLAND

ANNOTATED BIBLIOGRAPHIES

Copies of bibliographies prepared by the Commonwealth Bureau of Pastures and Field Crops, Hurley, and listed below, are available for sale. The price per copy includes the cost of postage by surface mail. If the order is to be sent by air mail, please add 1s. 6d.

Number	Subject	No. of refs	Period covered	Price
546	Groundnut " pops " : light, empty or aborted fruit	50	1953–66	10s.
926	Fodder radish	20	1949–65	4s.
982	Stabilization of sand by latex, bitumen and oil derivatives	8	1961–65	4s.
998	Ratoon cropping in swamp or wetland rice	20	1940–65	4s.
999	Effects of N, P and soil moisture on the vegetative growth of wheat, oats, barley and rye	31	1958–65	6s.
1005	Anatomy and morphology of barley	42	1947–66	8s.
1008	Water relations of the rice plant	70	1960–65	14s.
1010	Pigeon peas (*Cajanus cajan*)	47	1959–66	8s.
1012	Cigar tobacco	39	1936–64	6s.
1013	Methods for measuring evapotranspiration from crop areas	44	1960–66	8s.
1015	Effect of temperature on growth, flower production, fruit set and fruit development in the groundnut	16	1951–66	4s.
1016	Potatoes, effects of size of tuber and cut *v.* entire tubers on yield and growth	31	1958–66	6s.
1018	Production and processing of cassava	20	1951–66	4s.
1020	Annual cropping and shifting cultivation in the humid tropics	52	1958–66	10s.
1022	Border effects in plot experiments	39	1922–66	6s.
1024	Temperate oil-seed rape crops	205	1960–66	38s.
1025	Oil synthesis in crops : environmental effects	75	1955–66	14s.
1037	Techniques for the study of roots	52	1960–67	10s.
1046	Seed dormancy in groundnuts	14	1937–66	4s.
1047	Effect of water stress on the growth and development of groundnuts	21	1957–67	4s.
1049	*Xanthosoma* spp.	13	1956–66	4s.
1050	Cocoyams (*Colocasia* spp.)	39	1956–66	6s.
1063	Water stress in wheat	55	1962–66	10s.
1071	Sprinkler irrigation of rice	9	1951–67	4s.

REVIEW ARTICLES

Reprints of review articles appearing in this journal are available for sale, price 5s. 0d. per copy. Further details are given on page viii.

Orders for the above should be sent to :

The Director, Commonwealth Bureau of Pastures and Field Crops, Hurley, Berks, England

REVIEW ARTICLES – REPRINTS FOR SALE

The effect of weather on the growth of barley. L. P. Smith

Sesame. A. J. Tribe

Physiological approaches to yield determination in wheat and barley. R. H. M. Langer

The effect of shelter on the productivity of grasslands and field crops. Parts I and II. J. K. Marshall

Tobacco. A review of some recent developments, with particular reference to flue-cured tobacco. B. C. Akehurst

Cotton and cotton research in Africa. J. M. Munro

Scientific and technical periodicals on agriculture and agricultural biology published in the USSR. I. V. Larin

Poppy cultivation. Bengt Lööf

Light and crop production. J. L. Monteith

The pre-sprouting of seed potatoes : factors affecting sprout growth and subsequent yield. Parts I and II. R. D. Toosey

The kale crop in Great Britain. L. A. Willey

Yams, *Dioscorea* species. A. W. Waitt

Cowpeas, *Vigna unguiculata* (L.) Walp. J. P. F. Sellschop

Drought resistance of crop plants. L. H. May and F. L. Milthorpe

Pre-sowing hardening of plants to drought. An appraisal of the contributions by P. A. Genkel. L. H. May, E. J. Milthorpe and F. L. Milthorpe

The agronomic aspects of pigeon peas. H. J. Gooding

Plant population and crop yield, Parts I and II. R. Holliday

Research on oil-seed flax in North America. W. G. McGregor

The agronomy and present position of oil-seed crops in Scandinavia — a review of the literature. Bengt Lööf

A review of recent research on the agronomy of fibre flax. P. S. Frederiksen

The possibility of cultivating maize in regions with low temperatures. B. Torssell, E. Åberg and E. Åkerberg

Photoperiodism in rice. R. Best

Transpiration from crop plants. F. L. Milthorpe

The effect of undersowing on the cereal cover crop. A. H. Charles

Sowing and thinning the sugar-beet crop. P. N. Harvey

Recent developments in groundnut production, with special reference to Africa. Parts I and II. P. A. Oram

Bird-resistance in sorghum and the Quelea problem. H. Doggett

Light climate and crop growth in Finland. O. Pohjakallio

Winter-sown cereals for fodder and grain production. Parts I and II. R. Holliday

The control of weeds in cereal crops in Europe by chemical methods. E. K. Woodford and L. Kasasian

Fertilizer placement for arable and herbage crops. G. W. Cooke and F. V. Widdowson

Nutrient uptake from leaf sprays by crops. Gillian Thorne

Legislation on the burning of vegetation in the British Colonies. G. B. Masefield

Potatoes : the use of cut setts and the treatment of cut surfaces. P. J. Boyle and W. J. Baulkwill

Limited numbers of reprints of the above review articles are available for sale, price 5s. 0d. ($0.80) per copy, post free. Please send remittance with your order to : The Director, Commonwealth Bureau of Pastures and Field Crops, Hurley, Berkshire, England.